

CLAIMS

What is claimed is:

- 5 1. A method of fabricating a resistor comprising the acts of:
 - (a) activating a region on the surface of a flexible substrate, thereby forming an activated region;
 - (b) forming a resistive layer in the activated region;
 - (c) depositing one or more interconnect layers over at least a portion of
 - 10 the resistive layer; and
 - (d) patterning the one or more interconnect layers to form terminals of a resistor.
- 15 2. The method, as set forth in claim 1, wherein act (a) comprises the act of reactive ion etching the surface of a flexible substrate.
- 20 3. The method, as set forth in claim 1, wherein act (a) comprises the act of activating a region on the surface of a polyimide substrate.
- 25 4. The method, as set forth in claim 1, wherein act (b) comprises the act of depositing a metal layer over the activated region, thereby causing a reaction in the activated region that results in the formation of the resistive layer.
- 30 5. The method, as set forth in claim 4, wherein the act of depositing a metal layer comprises the act of depositing a titanium layer over the activated region, thereby causing a reaction in the activated region that results in the formation of a titanium-carbide layer.

6. The method, as set forth in claim 4, wherein act (c) comprises the act of depositing a copper layer over at least a portion of the metal layer.

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7. The method, as set forth in claim 6, wherein act (c) comprises the act of depositing a titanium layer over the copper layer.

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8. A method of fabricating a resistor comprising the acts of:

(a) activating the surface of a flexible substrate, thereby forming an activated layer;

(b) depositing a first metal layer over the surface of the activated layer, thereby causing a reaction in the activated layer that results in the formation of a resistive layer;

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(c) depositing one or more interconnect layers over the first metal layer;

(d) etching each of the one or more interconnect layers and the first metal layer to the resistive layer, thereby forming terminals; and

(e) patterning the resistive layer to form a resistor coupled between the terminals.

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9. The method, as set forth in claim 8, wherein act (a) comprises the act of ion etching the surface of a flexible substrate .

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10. The method, as set forth in claim 8, wherein act (a) comprises the act of activating a region on the surface of a polyimide substrate.

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11. The method, as set forth in claim 8, wherein act (b) comprises the act of depositing a titanium layer over the activated region, thereby causing a reaction in the activated region that results in the formation of a titanium-carbide layer.

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12. The method, as set forth in claim 8, wherein act (c) comprises the act of depositing a copper layer over the first metal layer.

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13. The method, as set forth in claim 12, wherein act (c) comprises the act of depositing a titanium layer over the copper layer.

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14. The method, as set forth in claim 8, wherein act (d) comprises the act of etching each of the one or more interconnect layers and the first metal layer to the resistive layer, using a wet chemical etch process.

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15. The method, as set forth in claim 8, wherein act (e) comprises the act of patterning the resistive layer using a plasma etch process.

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16. The method, as set forth in claim 8, wherein act (e) comprises the act of patterning the resistive layer to form a resistor having a resistance in the range of 300 kohms - 1 Mohm.

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17. The method, as set forth in claim 8, wherein the acts are performed in the recited order.

18. A method of fabricating a resistor comprising the acts of:

- (a) depositing a masking layer over the surface of a flexible substrate;
- (b) forming an opening in the masking layer, thereby exposing a portion of the flexible substrate through the opening;
- (c) activating the exposed portion of the flexible substrate, thereby forming an activated region;
- (d) removing the masking layer from the surface of the flexible substrate;
- (e) depositing one or more interconnect layers over the surface of the flexible substrate; and
- (f) patterning the one or more interconnect layers to form isolated terminals electrically coupled with respect to each other by the activated region.

19. The method, as set forth in claim 18, wherein act (a) comprises the act of depositing a titanium layer over the surface of the flexible substrate.

20. The method, as set forth in claim 18, wherein act (a) comprises the act of depositing a masking layer over the surface of a polyimide substrate.

21. The method, as set forth in claim 18, wherein act (b) comprises the act of etching an opening in the masking layer.

22. The method, as set forth in claim 18, wherein act (c) comprises the act of reactive ion etching the exposed portion of the flexible substrate.

23. The method, as set forth in claim 18, wherein act (c) comprises the act of activating the exposed portion of the flexible substrate, thereby forming an activated region having a resistance in the range of 300 kohms - 1 Mohm.

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24. The method, as set forth in claim 18, wherein act (d) comprises the act of chemically etching the masking layer.

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25. The method, as set forth in claim 18, wherein act (e) comprises the act of depositing a first titanium layer over the surface of the flexible substrate.

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26. The method, as set forth in claim 25, wherein act (e) comprises the act of depositing a copper layer over the first titanium layer.

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27. The method, as set forth in claim 26, wherein act (e) comprises the act of depositing a second titanium layer over the copper layer.

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28. The method, as set forth in claim 18, wherein act (f) comprises the act of chemically etching the one or more interconnect layers to form isolated terminals electrically coupled with respect to each other by the activated region

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29. The method, as set forth in claim 18, wherein the acts are performed in the recited order.

30. A device comprising:
a flexible substrate;
a resistive region formed on the flexible substrate and having a first end
and a second end; and
5 conductive terminals coupled to each of the first end and the second end.

31. The device, as set forth in claim 30, wherein the flexible substrate
comprises a polyimide material.

32. The device, as set forth in claim 30, wherein the resistive region has a
resistance in the range of 300 kohms - 1 Mohm.

33. The device, as set forth in claim 30, wherein the resistive region
comprises a metal-carbide.

34. The device, as set forth in claim 30, wherein the resistive region
comprises a titanium-carbide.

35. The device, as set forth in claim 30, wherein the resistive region is
formed at a temperature of less than 200°C.

36. The device, as set forth in claim 30, wherein the resistive structure does
not comprise a serpentine structure.

37. The device, as set forth in claim 30, wherein the resistive structure is formed in an activated region of the flexible substrate via a reaction between the activated region and a metal disposed on the activated region.

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38. The device, as set forth in claim 30, wherein each of the conductive terminals comprises a first layer of titanium.

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39. The device, as set forth in claim 38, wherein each of the conductive terminals comprises a layer of copper.

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40. The device, as set forth in claim 39, wherein each of the conductive terminals comprise a second layer of titanium disposed on the layer of copper.

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41. The device, as set forth in claim 30, comprising a light emitting diode (LED) electrically coupled to each of the conductive terminals.

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42. A device comprising:
a flexible substrate having a first side and a second side;
a light emitting diode (LED) coupled to the first side of the flexible substrate and electrically coupled to contact regions on the second side of the flexible substrate; and
a resistor formed on the second side of the flexible substrate, wherein the resistor is electrically coupled between each of the contact regions.

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43. The device, as set forth in claim 42, wherein the flexible substrate comprises a polyimide material.

5 44. The device, as set forth in claim 42, wherein the resistor has a resistance in the range of 300 kohms - 1 Mohm.

10 45. The device, as set forth in claim 42, wherein the resistor comprises a titanium-carbide region.

15 46. The device, as set forth in claim 42, wherein the resistor is formed at a temperature of less than 200°C.

 47. The device, as set forth in claim 42, wherein the resistor does not comprise a serpentine structure.

20 48. The device, as set forth in claim 42, wherein the resistor is formed in an activated region on the second side of the flexible substrate via a reaction between the activated region and a metal disposed on the activated region.

25 49. The device, as set forth in claim 48, wherein the resistor comprises a metal-carbide region coupled between each of a first interconnect region and a second interconnect region.

30 50. The device, as set forth in claim 49, wherein each of the first and second interconnect regions comprises a first layer of titanium.

51. The device, as set forth in claim 50, wherein each of the first and second interconnect regions comprises a layer of copper.

5 52. The device, as set forth in claim 51, wherein each of the first and second interconnect regions comprise a second layer of titanium deposited on the layer of copper.

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